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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/812,626
Filing Date: March 29, 2004
Appellant(s): ALDRICH ET AL.

Bradley C. Aldrich
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 07/02/2010 appealing from the Office action mailed 12/29/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1-18, 24-27 and 32-34 are pending and stand rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-11, 24-27 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reitan (US Patent Number 5,600,574) in view of Leffel (US Publication Number 2005/0057303 A1).

Regarding Claim 1, Reitan'574 shows an image processing device comprising: a look-up table (LUT) storing sample outputs from an output range of a transfer function, wherein the transfer function maps sample inputs from an input range of the transfer function to the sample outputs, and wherein, based on a curvature of the transfer function (i.e., the response curve of the transfer function. See Column 16, 8-17 and 35-54, See Column 21, Lines 55-67, Column 22, Lines and also see Figures 9-11), the sample inputs being distributed so that more sample inputs are associated with a first region of the transfer function than a second region of the transfer function (i.e., Look up tables used to transform (transform function) pixel quantities, where calibration, adaptation and various representations can be achieved by fixing the look up table to do most of the sampling on a specified region. An image may contain a

broad range of densities (column 16, lines 6-10) where just a specific region of interest can be chose to be the specific interest of densities wanted (a long and narrow region of interest is assigned to the center of the digital image, column 18, lines 20-25). Then the look up table is fixed (save new LUT files, fig. 14C) to take the majority of samples on that specified region of interest leaving the other region not chosen as the second region with less samples/no samples; perform conversion of incoming/input pixel/image data to an outgoing/output pixel data set with a desired transfer function ((transfer function input sampling distribution depends on the desired regions information)). See Column 16, Lines 6-31, Column 17, Lines 26-67, Column 18, Lines 20-55 and Column 21, Lines 55-66 and See Column 22, Lines 5-10).

Reitan'574 fails to show the device comprising an address module to calculate an index into the LUT based on image data.

Leffel'303 teaches an address module to calculate an index into the LUT based on image data (i.e., the look-up table contains an index calculating module. See Paragraphs 45).

Having the system of Reitan'574 and then given the well-established teaching of the Leffel'303, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system as suggested by the combination of Reitan'574 with the teachings of Leffel'303 by adding an address module to calculate an index into the LUT, in order to improve the systems precision of the system by updating the Look-up table depending on the image data.

Regarding Claim 2, Reitan'574 shows an image processing device further comprising an interpolation module to calculate transferred image data using the sample output in the LUT addressed by the index (i.e., to represent the output samples/image data. See Column 21, Lines 63-66 and See Column 22, Lines 36-44).

Regarding Claim 3, Reitan'574 shows an image processing device further comprising a plurality of additional LUTs, one LUT to correspond to each color channel used by a color space (i.e., plurality of LUT's. See Column 22, Lines 5-10).

Regarding Claim 4, Reitan'574 shows an image processing device further comprising a color filter to determine a color of the image data and to select one of the plurality of LUTs based on the determined color (i.e., filtering. See Column 19, Lines 30-35).

Regarding Claim 5, Reitan'574 shows an image processing device wherein the interpolation module also uses the image data to calculate the transferred image data (i.e., See Column 13, Lines 24-35).

Regarding Claim 6, the combination of Reitan'574 and Leffel'303 shows an image processing device wherein the address module calculates the index by accessing a region pointer based on a first part of the image data, and combining the region pointer with a second part of the image data (i.e., a pointer offsets allow LUT to shift values. See Paragraph 101 in reference Leffel'303).

Regarding Claim 7, the combination of Reitan'574 and Leffel'303 shows an image processing device wherein the first part of the image data comprises the first two bits of the image data that determine a quartile, the region pointer comprises a quartile pointer that addresses the first sample output mapped from a sample input in the quartile, and the second part of the image data indicates the address of the indexed sample output within the quartile (i.e., a pointer offset allow LUT to shift values in the necessary way. See Paragraphs 101,107 and 116-117 in reference Leffel'303).

Regarding Claim 8, the combination of Reitan'574 and Leffel'303 shows an image processing device wherein the transfer function has four regions, the first and second regions each being one of the four regions, and the region pointer identifies with which of the four regions the image data is associated (i.e., a pointer offset allow LUT to shift values in the necessary way. See Paragraphs 101,107 and 116-117 in reference Leffel'303).

Regarding Claim 9, Reitan'574 shows an image processing device wherein the transferred image data comprises companded image data (i.e., compressed to 8 bits. See Column 22, Lines 40-45).

Regarding Claim 10, Reitan'574 shows an image processing device wherein the transferred image data comprises gamma-corrected image data (i.e., gamma correction. See Column 22, Lines 40-45 and See Column 32, Lines 23-27).

Regarding Claim 24, Reitan'574 shows a method comprising: receiving image data (i.e., the system includes apparatus for image acquisition. See Column 2, Lines 49-55, Column 4, Lines 35-50 and Column 9, Lines 35-50), the image data being input for a

transfer function the transfer function mapping an input range to an output range (i.e., mapping of the transfer function. See Column 17, Lines 28-55 and 59-67, Column 18, Lines 20-42); using a first section of the received image data to identify a region of the input range of the transfer function to which the received image data belongs (i.e., regions can be identified based on the interest of the process. See Column 17, Lines 28-45); selecting a second section of the received image data based on the identified region (i.e., regions can be identified based on the interest of the process. See Column 17, Lines 28-45); addressing an entry of a look-up table (LUT) using the first and second sections of the image data (i.e., Look up tables used to transform (transform function) pixel quantities, where calibration, adaptation and various representations can be achieved by fixing the look up table to do most of the sampling on a specified region. An image may contain a broad range of densities (column 16, lines 6-10) where just a specific region of interest can be chose to be the specific interest of densities wanted (a long and narrow region of interest is assigned to the center of the digital image, column 18, lines 20-25). Then the look up table is fixed (save new LUT files, fig. 14C) to take the majority of samples on that specified region of interest leaving the other region not chosen as the second region with less samples/no samples; perform conversion of incoming/input pixel/image data to an outgoing/output pixel data set with a desired transfer function ((transfer function input sampling distribution depends on the desired regions information)). See Column 16, Lines 6-31, Column 17, Lines 26-67, Column 18, Lines 20-55 and Column 21, Lines 55-66 and See Column 22, Lines 5-10)

Reitan'574 fails to show the device comprising an address module for calculating a transferred image data by using the addressed entry and a residual section of the image data.

Leffel'303 teaches an address module for calculating a transferred image data by using the addressed entry and a residual section of the image data (i.e., the look-up table contains an index calculating module. See Paragraphs 45, 59, 92, 101 and 106).

Having the system of Reitan'574 and then given the well-established teaching of the Leffel'303, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system as suggested by the combination of Reitan'574 with the teachings of Leffel'303 by adding an address module to calculate an index into the LUT, in order to improve the systems precision of the system by updating the Look-up table depending on the image data.

With regards to method Claim 25, the limitation of the claim 25 are corrected by limitation of claim 9 above. The steps of claim 25 read into the function step of claim 9.

With regards to method Claim 26, the limitation of the claim 26 are corrected by limitation of claim 6 above. The steps of claim 26 read into the function step of claim 6.

With regards to method Claim 27, the limitation of the claim 27 are corrected by limitation of claim 5 above. The steps of claim 27 read into the function step of claim 5.

With regards to method Claim 32, the limitation of the claim 32 are corrected by limitation of claim 24 above. The steps of claim 32 read into the function step of claim 24.

With regards to method Claim 33, the limitation of the claim 33 are corrected by limitation of claim 25 above. The steps of claim 33 read into the function step of claim 25.

With regards to method Claim 34, the limitation of the claim 34 are corrected by limitation of claim 26 above. The steps of claim 34 read into the function step of claim 26.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reitan (US Patent Number 5,600,574)in view of Takane (US Publication Number 2002/0030751 A1).

Regarding Claim 11, Reitan'574 shows a digital camera for capturing digital video or still images (i.e., a digital image system electronic camera. See Column 1, Lines 12-15 and 30-31 and See Column 2, Lines 50-54), the digital camera comprising: a look-up table (LUT) storing sample outputs from an output range of an image processing transfer function, wherein the image processing transfer function maps sample inputs from an input range of the image processing transfer function to the sample outputs, and wherein, based on a curvature of the transfer function (i.e., the response curve of the transfer function. See Column 16, 8-17 and 35-54, See Column 21, Lines 55-67, Column 22, Lines and also see Figures 9-11), the sample inputs are distributed so that more sample inputs are associated with a first region of the transfer function than a second region of the transfer function (i.e., Look up tables used to transform (transform function) pixel quantities, where calibration, adaptation and various representations can be achieved by fixing the look up table to do most of the sampling on a specified region.

An image may contain a broad range of densities (column 16, lines 6-10) where just a specific region of interest can be chose to be the specific interest of densities wanted (a long and narrow region of interest is assigned to the center of the digital image, column 18, lines 20-25). Then the look up table is fixed (save new LUT files, fig. 14C) to take the majority of samples on that specified region of interest leaving the other region not chosen as the second region with less samples/no samples; perform conversion of incoming/input pixel/image data to an outgoing/output pixel data set with a desired transfer function ((transfer function input sampling distribution depends on the desired regions information)). See Column 16, Lines 6-31, Column 17, Lines 26-67, Column 18, Lines 20-55 and Column 21, Lines 55-66 and See Column 22, Lines 5-10).

Reitan'574 fails to show the digital camera comprising a sensor to convert light into image data and a battery to power the sensor and the LUT.

Takane'751 teaches a digital camera comprising a sensor to convert light into image data (i.e., image sensor to convert light. See Paragraphs 49) and a battery to power the sensor and the LUT (i.e., the camera has a battery to give power for all the processing including the use of the LUTs. See Paragraphs 53 and 214).

Having the system of Reitan'574 and then given the well-established teaching of the Takane'751, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system as suggested by the combination of Reitan'574 with the teachings of Takane'751 by adding a sensor to convert light into image data and a battery to power the sensor and the LUT, in order to improve the systems performance and superior durability by having a battery to power the system.

Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reitan (US Patent Number 5,600,574) in view of Takane (US Publication Number 2002/0030751 A1) and further in view of Leffel (US Publication Number 2005/0057303 A1).

Regarding Claim 12, the combination of Reitan'574 and Takane'751 fails to show a digital camera, further comprising an address module to calculate an index into the LUT based on image data.

Leffel'303 teaches a system comprising an address module to calculate an index into the LUT based on image data (i.e., the look-up table contains an index calculating module. See Paragraphs 45).

Having the system of Reitan'574 and then given the well-established teaching of the Leffel'303, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system as suggested by the combination of Reitan'574 with the teachings of Leffel'303 by adding an address module to calculate an index into the LUT, in order to improve the systems precision of the system by updating the Look-up table depending on the image data.

Regarding Claim 13, Reitan'574 shows a digital camera, further comprising an interpolation module to calculate transferred image data using the image data and the sample output in the LUT addressed by the index (i.e., to represent the output samples/image data. See Column 21, Lines 63-66 and See Column 22, Lines 36-44).

Regarding Claim 14, Reitan'574 shows a digital camera further comprising a plurality of additional LUTs, one LUT to correspond to each color channel used by a color space (i.e., plurality of LUT's. See Column 22, Lines 5-10).

Regarding Claim 15, Reitan'574 shows a digital camera further comprising a color filter to determine a color of the image data and to select one of the plurality of LUTs based on the determined color (i.e., filtering. See Column 19, Lines 30-35).

Regarding Claim 16, the combination of Reitan'574, Takane'751 and Leffel'303 shows a digital camera wherein the address module calculates the index by accessing a region pointer based on a first part of the image data, and combining the region pointer with a second part of the image data (i.e., a pointer offsets allow LUT to shift values. See Paragraph 101 in reference Leffel'303).

Regarding Claim 17, the combination of Reitan'574, Takane'751 and Leffel'303 shows a digital camera wherein the transfer function has four regions, the first and second regions each being one of the four regions, and the region pointer identifies with which of the four regions the image data is associated (i.e., a pointer offset allow LUT to shift values in the necessary way. See Paragraphs 101,107 and 116-117 in reference Leffel'303).

Regarding Claim 18, Reitan'574 shows a digital camera wherein the image processing transfer function comprises a gamma-correction transfer function (i.e., gamma correction. See Column 22, Lines 40-45 and See Column 32, Lines 23-27).

(10) Response to Argument

Appellant, on pages 10-12, argues that Reitan fails to disclose that “based on the curvature of a transfer function, sample inputs are distributed so that more sample inputs are associated with a first region of the transfer function than a second region of the transfer function”. Examiner respectfully disagrees. Reitan samples within a region of interest based on the curvature of a transfer function to avoid the majority of samples to be taken from the region belonging to the curve of the transfer function. A transfer function is a mathematical representation, in terms of spatial or temporal frequency, of the relation between the input and output of a (linear time-invariant) system. Most real systems have non-linear input/output characteristics, but many systems when operated within nominal parameters (not “over driven”) have behavior that is close enough to linear with an acceptable behavior. Reitan on Figure 6, 8 and 9 shows sampling done to target a specific region in order to avoid the curvature/nonlinearities of the transfer function avoiding distortion and for getting the more proper performance level. For example, fig. 8 showing the actual OD (density) is going at least to the value of 4.5, of the transfer function shown in fig. 8 (also see column 15, lines 40-66, and column 16, lines 1-25), but fig. 6 showing the actual sampled input region ends at 3.6 OD. Clearly, the region from 0 to 3.6 has more samples compare to region 3.6 to 4.5. The reason that Reitan does that is because after 3.6, the transfer function is no longer linear. Reitan’s correction method is to detect any nonlinearities of the curve (column 16, lines 5-20) signaling Reitan’s system is more interested in the linear region of the curve and any nonlinearities need to be corrected. Therefore Reitan does shows sampling inputs so that more sample inputs are associated with a first region (linear, non curve) of the

transfer function than a second (nonlinear, curve) region based on the transfer function curve.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Iriana Cruz/

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/King Y. Poon/

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